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Research on software development platform based on SSH framework structure

Yongchang Ren[a], Deyi Jiang[b], Tao Xing[c], Ping Zhu[a],a*

[a]College of Information Science and Technology, Bohai University, Jinzhou 121013, P.R. China
[b]Management Committee of Chentang Technology Business District, Tianjin, 300220, P.R. China
[c]Beijing Research Center of Urban Systems Engineering, Beijing 100089, P.R. China

Abstract

The research of software development platform is a complex system engineering. For the current problems in the field of Web application development, use computer related technology, combine with the more popular open source framework SSH, research the software development platform that based on SSH framework construction. Based on the analysis of the existing problems of software development, emphatically studies the key techniques of SSH framework platform, including the presentation layer framework Struts, business logic framework Spring, data persistence layer framework Hibernate, J2EE framework integrated the new SSH and so on. The research content of this article applied to large Web program development enterprise, it makes for promoting productivity and improving software quality, and has an important significant to promote the development of software industry in China.

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Keywords: SSH framework; software development platform; Struts; Spring; Hibernate;

1. Introduction

The development of large enterprise-class Web application system usually requires a good software architecture to facilitate the collaborative development expansion and upgrading, but the traditional development model can't meet these requirements. For the current problems in the field of Web application development, following the principles and methods of systems engineering, comprehensive use software engineering, database systems, computer networks, object-oriented technology, and

* Corresponding author. Tel.: 13897854226; fax: 0416-3400199.
E-mail address: rycryc@sina.com.

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combining with the more popular open source framework SSH (Spring, Struts, Hibernate), study the software automatic generation platform based on B/S structure of Java framework, to help developers build a Web application system of clear structure, good reusability and easy maintenance in the short term.

The design idea is running by the front end program that front large databases supported, the code of software development automatically complete by computer, programmers don't need to master Java and database technology will be able to develop better software systems. Translate the traditional coding of software development to system analysis, reduces the technical requirements for software developers, improve the development productivity of software, and changes the traditional software development model.

2. Problems in Software Development

At this stage there are many problems in software development, mainly in the following areas [1]:

(1) The phenomena of software development "demand exceeds supply" effects the development of enterprises. Different companies need different software, without a universal software can be applied to each enterprise management information system. Software development cycle is long, code errors, software reliability is poor, unfavorable to maintain and upgrade. The need that enterprise for software more complex, and the software provided by software development companies enterprise are not satisfied.

(2) Software quality is unreliable, software maintenance is poor, users typically are not satisfied with the completed software. Software error is inevitable, and software testing need to spend a lot of time. Software maintenance personnel not only understand business processes, but also familiar with software development technology, to solve a bug in the software may introduce new bugs, and many people are not willing to engage in software Maintenance. If Software often wrong, will cause users' dissatisfaction, and ultimately be abandoned.

(3) Software development personnel can't meet the needs of the market, they need to master too much knowledge. Software development requires master: database technology, database access technology and a variety of database management systems, network and Internet technology, development tools and related structures and class libraries, software testing and analysis tools, and many other technologies. As the acceleration of technical upgrading, developers constantly learning new technique while be busy working, the burden is too heavy.

(4) The frequent flow of software developers has a great loss to the company. Software is the intellectual products of people, each one has their own programming habits, ideas and methods. It's very difficult to read someone's program. If the developers leave the project half-way, others will difficult to take over, and even leave after the delivery of software projects, others also very difficult to maintain.

(5) Software don't have the appropriate document, that caused great difficulties to the latter part of the development, maintenance and reconstruction. Software development should be first to write a document then write the program, modify the program after modify the document. But some developers do not develop good habits; some busy to write or modify the program and forget to modify the document, resulting in inconsistent with the document and procedures; many software development companies have no clear requirements in the quantity, quality and format of the document.

3. Key Technology of SSH Framework Platform

The development of large enterprise-class Web application system usually requires a good software architecture to facilitate the collaborative development expansion and upgrading, and the more popular

open source framework SSH, is a lightweight solution to develop the Web applications of enterprise-class J2EE. At present, the market there have been some commercial, open source application framework that based on J2EE, in which the mainstream framework technologies are Struts framework based on MVC pattern and Spring framework based on IoC pattern and object / relations mapping framework Hibernate and so on [1].

3.1. Presentation Layer Framework Struts

It is the MVC framework realized on the base of JSP Model, mainly divided into three parts of Model, Viewer and Controller, the design concept is decoupling performance logic and business logic through Controller, to improve the maintainability, scalability and reusability of system [2-4]. The architecture of Struts framework shown in figure 1.

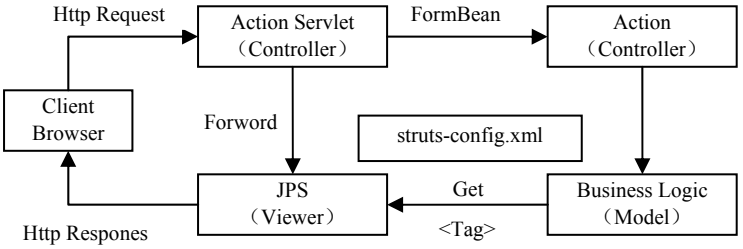

Fig.1. Architecture of Struts framework

View. View major comprises the JSP page, there is no process logic, business logic and model information, only mark. Struts itself contains a set of TagLib, which is also one of the essence, flexibly use can simplify the code of JSP pages and improve the development efficiency.

Controller. The Controller in Struts is ActionServlet mainly provided by itself. ActionServlet receives all requests from clients and transfers the control to the appropriate Action according to the configuration file (struts-config.xml).

Model. Struts don't define the implementation of specific Model layer, Model layer usually closely relates with business logic, and has persistence requirements. At present in commercial areas and the open source world, both have some excellent tools for facilitating the development of Model layer.

3.2. Business Logic Layer Framework Spring

It's a powerful lightweight framework that solutes many common problems in J2EE and can replace EJB technology. Lightweight refers here is the Spring framework itself rather than means Spring can only be used for lightweight application development [8]. The lightness of Spring reflects in the framework of their own infrastructure and the support and assembly capabilities for other application tools. Compared with the colossus EJB, Spring can make process development personnel reduce the risk that between the various techniques levels.

In this way, without writing factory pattern, single pattern, or other construction method, can directly to obtain the necessary business components through the container. The structure of Spring framework shown in figure 2.

Spring framework consists of seven well-defined modules, and each module or component can stand alone,

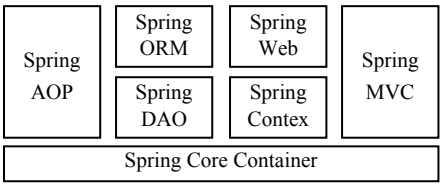

Fig.2. Modules of Spring framework

or realizes joint with one or more modules. Spring Core Container is used to manage the IoC container of business component of, is the core of Spring applications; Spring DAO and Spring ORM provides abstraction module of data access, also integrates on Hibernate, JDO and iBatis and so popular support for object-relational mapping framework Module, and provides a buffer connection pooling, transaction processing and other important services function to ensure the system performance and data integrity; Spring Web module provides a number of abstract package of Web application, which can integrate Web framework such as Struts, WebWork and Spring to their own solutions.

3.3. Data Persistence Layer Framework Hibernate

O / R Mapping technology is generated to solve the contradiction not match between relational database and object-oriented programming. Hibernate is the most popular O / R Mapping framework, automatic mapping between relational database and Java objects, that programmers can use a very simple way to achieve database operation. The working principle of Hibernate shown in figure 3.

Hibernate through JDBC package, shields the underlying database operations to programmer, so the programmer focus on OO application development, and improve development efficiency. The work programmers access the database is prepare Xml mapping file for persistent object.

Changes in the underlying database simply change the initial configuration file (hibernate.cfg.xml or hibernate.properties) can not affect the application.

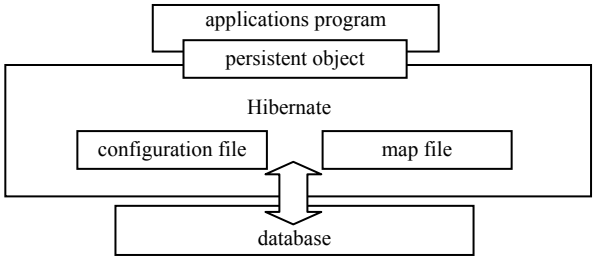

Fig.3. Working principle of Hibernate

Hibernate has its own object-oriented query language HQL, HQL is powerful and supports for the current most popular databases such as Oracle, DB2, MySQL, Microsoft SQL Server, etc., is the most widely used O / R mapping tool. Hibernate provides the underlying support for the rapid development application.

3.4. New J2EE Framework for Integrated SSH

Analyzed the three framework technology based on J2EE, then improve the traditional J2EE Web development model through integrating these three technologies framework, form a new, lightweight J2EE framework. System architecture of integrated SSH framework shown in figure 4.

From the responsibility system is divided into four layers: presentation layer, business logic layer, data persistence layer and domain module layer. Which uses Struts as the overall infrastructure of system, is responsible for the separation of MVC, in the model of Struts framework, we use Hibernate framework to support for presentation layer, the business layer with Spring. Specifically way is: Based on requirements put forward some modules by object oriented analysis method, implement these models as a basic Java object, and then write a basic DAO interface, and gives the DAO implementation of Hibernate, using

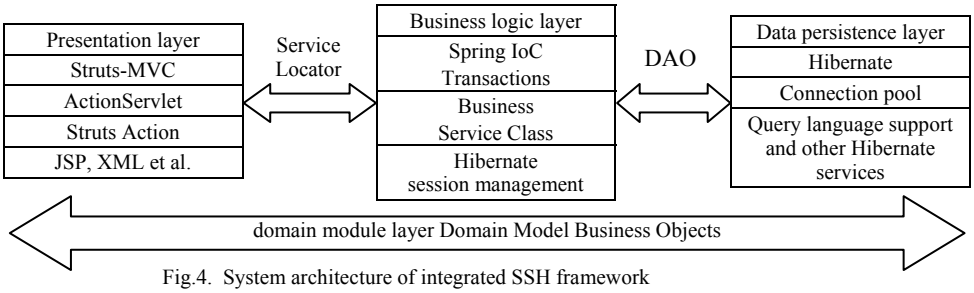

Fig.4. System architecture of integrated SSH framework

DAO classes that implemented by Hibernate framework to achieve the conversion and access between Java classes and database, and finally completed business logic by the Spring.

The basic business processes of system are: in the presentation layer, first through the JSP interface realize interaction interface, and responsible for sending Request and receiving Response, then according to the configuration files (struts-config.xml) Struts delegates the Request received by ActionServlet to the appropriate Action to treatment. In the business layer, the Spring IoC container of management services component is responsible for providing services to the Action Model components and the DAO of this component to complete business logic, and provides transaction processing, buffer pool and so on container components to improve system performance and ensure data integrity. In the persistence layer, depends on the object mapping of Hibernate and database interaction, dealing with the data that DAO components requested and returns the results.

4. Conclusion

With SSH framework, not only achieves the complete separation of View, Controller and Model, but also realizes the separation of business logic layer and persistence layer. No matter what changes the front, the model layer with little changes, and database changes will not affect front-end and improves the reusability of the system. As the coupling between different layers is small, it's conducive to team members work in parallel and improve development efficiency.

Acknowledgment

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